Solid containing groups which are attached to the parent structure via urethane groups and which contain bonds which can be activated with actinic radiation, and its use

Claims

1. A solid containing on average per molecule at least two groups (a) having at least one bond which can be activated with actinic radiation whereby the groups (a) are structurally different from one another and are attached to the parent structure of the solid via urethane groups.

2. A solid containing

a) on average per molecule more than one group having at least one bond which can be activated with actinic radiation, the groups being structurally different from one another or the same and being attached to the parent structure of the solid via urethane groups, and

b) from 0.01 to 1 mol%, based on the double bonds present of at least one chemically bonded stabilizer,

preparable by reacting the starting products in the melt.

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3. The solid as claimed in claim 1 or 2, characterized in that the bonds which can be activated with actinic radiation comprise carbon-hydrogen single bonds or carbon-carbon, carbon-oxygen, carbon-nitrogen, carbon-phosphorus or carbon-silicon single bonds or double bonds, especially carbon-carbon double bonds.

4. The solid as claimed in claim 2 or 3, characterized in that at least one HALS compounds containing at least one isocyanate-reactive group is used as starting product for introducing the chemically bonded polymerization inhibitor (b).

5. The solid as claimed in any of claims 1 to 4, characterized in that the groups (a) are selected from the group containing (meth)acrylate, ethacrylate, crotonate, cinnamate, vinyl ether, vinyl ester, dicyclopentadienyl, norbornenyl, isoprenyl, isoprenyl, isopropenyl, allyl or butenyl groups; dicyclopentadienyl ether, norbornenyl ether, isoprenyl ether, isopropenyl ether, allyl ether or butenyl ether groups, or dicyclopentadienyl ester, norbornenyl ester, isoprenyl ester, isopropenyl ester, allyl ester or butenyl ester groups.

6. The solid as claimed in claim 5, characterized in that it [lacuna] at least one (meth)acrylate group, especially an acrylate group, and at least one group (a) selected from the group containing ethacrylate, crotonate, cinnamate, vinyl ether, vinyl ester, dicyclopentadienyl, norbornenyl, isoprenyl, isopropenyl, allyl and butenyl groups; isoprenyl ether, isopropenyl ether, allyl ether and butenyl ether groups, and also isoprenyl ester, isopropenyl ester, allyl ester and butenyl ester groups.

7. The solid as claimed in any of claims 1 to 6, characterized in that it comprises chemically bonded photoinitiators and/or photocoinitiators.

8. The solid as claimed in any of claims 1 to 7, characterized in that it contains functional groups (e) which are able to undergo thermal crosslinking reactions with groups (e) of their own kind and/or with complementary functional groups (f).

9. The solid as claimed in any of claims 1 to 8, characterized in that it is amorphous, partly crystalline, or crystalline.

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10. The solid as claimed in any of claims 1 to 9, characterized in that it has a melting range or melting point in the temperature range from 40 to 130°C.

11. The solid as claimed in any of claims 1 to 10, characterized in that it has a melt viscosity at 130°C of from 50 to 20 000 mPas.

12. The solid as claimed in any of claims 1 to 11, characterized in that its parent structure is of low molecular mass, oligomeric and/or polymeric.

13. The solid as claimed in claim 12, characterized in that the oligomeric and/or polymeric parent structure contains olefinically unsaturated double bonds.

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14. The solid as claimed in claim 12 or 13, characterized in that the oligomeric and/or polymeric parent structure is derived from random, alternating and/or block, linear, branched, hyperbranched, dendrimeric and/or comb poly-addition resins, polycondensation resins and/or addition (co)polymers of ethylenically unsaturated monomers.

15. The solid as claimed in claim 14, characterized in that the addition (co)polymers are poly-

(meth)acrylates and/or partially hydrolyzed polyvinyl esters and the polyaddition resins and/or polycondensation resins are polyesters, alkyds, polyurethanes, polyester-polyurethanes, polylactones, polycarbonates, polyethers, poly-ether-polyesters, epoxy resin-amine adducts, polyureas, polyamides or polyimides, especially polyesters, polyester-polyethers, polyurethanes, and polyester-polyurethanes.

16. The use of the solid as claimed in any of claims 1 to 15 as coating materials, adhesives or sealing compound which can be crosslinked thermally and/or with actinic radiation, or to prepare coating materials, adhesives or sealing compounds which can be crosslinked thermally and/or with actinic radiation.

17. Coating materials, adhesives or sealing compounds comprising at least one solid as claimed in any of claims 1 to 15.

18. The coating materials, adhesives or sealing compounds as claimed in claim 17, characterized in that at least one further constituent curable with actinic radiation is present therein.

19. The coating materials, adhesives or sealing compounds as claimed in claim 18, characterized in

that the further constituent is selected from the group containing (meth)acryloyl-functional (meth)acrylic copolymers, polyether acrylates, polyester acrylates, unsaturated polyesters, epoxy acrylates, amino acrylates, melamine acrylates, silicone acrylates, and the corresponding methacrylates.

20. The coating materials, adhesives or sealing compounds as claimed in claim 19, characterized in that the unsaturated polyester is selected from the group containing amorphous, partly crystalline and crystalline solid polyesters containing at least one terminal group which derives from the adduct of dicyclopentadiene and maleic anhydride in a molar ratio of 1:1, and/or at least one endomethylenetetrahydrophthalic acid group.

21. The coating materials, adhesives or sealing compounds as claimed in any of claims 17 to 20, characterized in that at least one further additive is present therein.

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22. The coating materials, adhesives or sealing compounds as claimed in any of claims 17 to 21, characterized in that they are present as powders, powder slurries, or in solution or dispersion in organic solvents.

23. The use of the coating materials, adhesives or sealing compounds as claimed in any of claims 17 to 22 to produce coatings, adhesive films or seals for primed or unprimed substrates.

24. A process for producing coatings, adhesive films or seals for primed or unprimed substrates, wherein

(1) at least one coating material and/or adhesive and/or sealing compound as claimed in any of claims 17 to 22 in the form of

(1.1) a melt,

(1.2) a powder,

(1.3) a powder slurry or

(1.4) a dispersion or a solution in at least one organic solvent

is applied to the primed or unprimed substrate,

(2) the resulting powder slurry film (1.3) or the resulting film of a dispersion or a solution (1.4) is dried or the resulting film of the melt (1.1) is caused to solidify or is maintained in the melted state by heating,

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(3) the resulting solid film (1.2), (1.3) or (1.4) is melted by heating, and

(4) the melted film which results in process step (2) or (3),

(4.1) in the melted state,

(4.2) on solidification and/or

(4.3) after solidification,

is cured with actinic radiation.

25. The process as claimed in claim 24, characterized in that the film is thermally cured by heating during or after process step (4).

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26. The process as claimed in claim 24 or 25, characterized in that heating is carried out with near infrared (NIR) light.

27. Coatings, adhesive films or seals on primed or unprimed substrates, producible from coating materials, adhesives or sealing compounds as claimed in any of claims 17 to 22 and/or producible by means of the process as claimed in any of claims 24 to 26.

28. Primed and unprimed substrates, especially bodies of automobiles and commercial vehicles, industrial

components, including plastics parts, packaging, coils and electrical components, or furniture, comprising at least one coating, at least one adhesive film and/or at least one seal as claimed in claim 27.